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Soft X-ray loops connecting newly emerging magnetic bipoles

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Abstract. A soft X-ray (SXR) coronal loop sometimes appears to connect between opposite photospheric magnetic polarity elements in a newly emerging magnetic bipole, which we presented at the Hinode-2 meeting last year. This time, we report the physical properties of the SXR loops and the relationship between them and the photospheric magnetic field near their foot points.
It is often observed photospheric magnetic cancellations happen near X-ray bright points, which is thought to be a result of a magnetic reconnection between a pair of anti-parallel flux tubes. Assuming the same mechanism to heat up the SXR loops, the reconnection must happen near one of the foot points of the emerging flux loops. We looked into Hinode/SOT magnetograph data if we can see any magnetic cancellation around the foot points of the SXR loops.
We found many magnetic cancellation events, which can release enough energies to make coronal loops brighten in SXR. But only some of the brightenings temporally correlated with some of the cancellation events. There must be other ways to heat up the loops.